

Differentiating Subtypes of Postnatal Depression Based on a Cluster Analysis of Maternal Depressive Cognitions

**Nicole F. Church, D.Psych., Debra A. Dunstan, Ph.D., Donald
W. Hine, Ph.D., and Anthony D.G. Marks, Ph.D.**

Discipline of Psychology, University of New England, NSW, Australia

ABSTRACT: Based on the analysis of cognitive style, this study demonstrated that women experiencing postnatal depression (PND) fall into two categories: (a) those with a general cognitive vulnerability to depression and for whom childbirth is a non-specific stressor; and, (b) those whose depression is directly related to the stressful demands of motherhood. Studying an Australian sample of 406 postnatal women who completed the Edinburgh Postnatal Depression Scale (EPDS), the Dysfunctional Attitudes Scale (DAS-24), and the Maternal Attitudes Questionnaire (MAQ), hierarchical cluster analysis identified three groups distinguished on the basis of depressive symptomatology and/or the nature and strength of maladaptive cognitions.

KEY WORDS: Postnatal depression; dysfunctional maternal cognitions; dysfunctional general cognitions; sub-groups of PND

Postnatal depression (PND) is a common but serious condition affecting 10-20% of mothers in the first year postpartum (O'Hara, Neunaber, & Zekoski, 1984). The symptoms of PND include low mood, anhedonia, forgetfulness, irritability, anxiety, sleep disturbance, low self-esteem and guilt (Stuchbery, Matthey, & Barnett, 1998). In severe cases, PND can affect not only the mother's functioning, but also her partner's mood, and the cognitive, behavioral and emotional outcomes of her infant (Hendrick, 2003; Lovestone & Kumar, 1993).

The Diagnostic and Statistical Manual of Mental Disorders, fourth edition text revision, (DSM-IV-TR) classifies PND as a Major

Author Note: Author order is alphabetical. The first three authors all contributed equally to the preparation of this manuscript. We would like to thank Dr. Claire Lamplugh, Dr. Margaret Brechman-Toussaint, and the Perinatal Department at Nepean Hospital for their assistance with this project.

Corresponding author: Dr. Debra Dunstan, Lecturer in Clinical Psychology, Discipline of Psychology, University of New England, Armidale, NSW, 2351, Australia. Tel: (6) 12 6773 3764; Fax: (6) 12 6773 3820; email: ddunstan@une.edu.au

Depressive Disorder (MDD) that has an onset within four weeks of delivery (American Psychiatric Association, 2000). This classification reflects the observed similarity between the symptoms and presentation of PND and MDD, and suggests that the key distinguishing feature of PND is its temporal relationship with childbirth. However, evidence has emerged to suggest that differences can also be found in the cognitions of sufferers (Cooper & Murray, 1995; Olioff, 1991; Warner, Appleby, Whitton, & Faragher, 1997).

Cognitive theories of depression posit that dysfunctional attitudes and negatively-focused cognitive schemata form a relatively stable risk factor for the onset of depressive symptoms (Abramson, Seligman, & Teasdale, 1978; Alloy et al., 1999; Beck, 1967). Such schemata, which involve themes of failure, inadequacy and hopelessness, are typically represented within global dysfunctional attitudes about the self, the world and the future (Beck, 1967). High levels of dysfunctional attitudes, often assessed by the Dysfunctional Attitude Scale (Weissman & Beck, 1978), have been shown to be a trait-like feature (Zuroff, Blatt, Sanislow, Bondi, & Pilkonis, 1999) associated with vulnerability to depression (Otto et al, 2007) and the severity of depressive symptomatology (Dent & Teasdale, 1988; Norman, Miller, & Keitner, 1987). Within the wider literature, a body of evidence consistently demonstrates a positive relationship between global negative thinking patterns and MDD (Alloy et al., 1999; Reilly-Harrington, Alloy, Fresco, & Whitehouse, 1999; Woody, Taylor, McLean, & Koch, 1998).

As would be expected, dysfunctional negative cognitions are also evident in women with PND (Grazioli & Terry, 2000; Olioff, 1991; Warner et al., 1997). In line with the diathesis-stress components of Beck's cognitive theory of depression (Beck, 1967), and as implied by the DSM-IV-TR diagnostic criteria, high scores on the DAS-24 have been found to be predictive of PND in women who also report high levels of parental stress (Beck, 1967; Grazioli & Terry, 2000). However, it seems that not all women with PND experience negative cognitions relating to the experience of childbirth (Warner et al., 1997). Using the Maternal Attitudes Questionnaire (MAQ) to measure maladaptive attitudes to motherhood, Warner et al. (1997) found that a sub-group of women who become depressed in the postnatal period do not engage in such thoughts. This finding supported Cooper and Murray's (1995) earlier proposal that women with PND fall into two categories: (a) those with a general cognitive vulnerability to depression and for whom the birth of their child functions as a non-specific stressor; and, (b) those whose depression is directly related to the stressful demands

of motherhood.

The possibility that two sets of negative cognitions can serve as risk factors for PND is perhaps reflected in the evidence-based treatments for this disorder. Cognitive behavioral therapy (CBT; Beck, Rush, Shaw, & Emery, 1979), which aims to alter negatively-focused cognitions, is a standard empirically-validated treatment for MDD (Elkin, 1994) and PND (National Institute for Health and Clinical Excellence, 2006, 2007). However, other treatments for PND that address adjustment and role-transition issues have also been shown to be effective [e.g., mothercraft skills training (Perth Clinic, 2006), non-directive supportive counseling (National Institute for Health and Clinical Excellence, 2007) and Interpersonal Therapy (IPT) (National Institute for Health and Clinical Excellence, 2007; O'Hara, Stuart, Gorman, & Wenzel, 2000)]. If empirical support was found for Cooper and Murray's proposition that PND sufferers are a cognitively heterogeneous group, then perhaps recommended treatments could be targeted to more specifically address the underlying mechanisms of pathology.

The purpose of this study, therefore, was to examine the negative cognitions of women suffering from PND. By measuring both general depressogenic and maternal-specific negative attitudes, we predicted that subgroups, based on cognitive style, would be found. In the light of previous studies, we hypothesized that depression in some participants would be associated with elevated levels of both general and maternal-specific dysfunctional attitudes, but in others, dysfunctional maternal attitudes alone would be the main cognitive correlate of their depression.

METHOD

Participants

The names of 1100 women who had given birth in the previous 5 to 14 weeks (identified on six different occasions across a 12-month period) were randomly selected from the birth register of a large metropolitan health district in Sydney, Australia. The women were mailed an explanatory letter, a consent form, questionnaires and a reply paid envelope. Women were excluded if they were suffering from severe puerperal psychosis or if their infant had significant health problems and/or required neonatal intensive care. Of those contacted, 37% (N = 406) returned completed questionnaires. The modal time for questionnaire completion was 12 weeks postpartum.

Twenty-two percent of respondents ($n = 89$) exhibited depressive symptoms potentially within the clinical range (EPDS scores ≥ 10). This subgroup was the primary focus of this investigation. These respondents were aged between 20 and 41 years ($M = 29.64$, $SD = 5.08$) with diverse educational backgrounds (30% 10 years or less of formal education, 26% 12 years, 37% technical trade or graduate level, 7% post-graduate level). Forty-nine percent of women were primiparous, 26% had two children, 18% had three and the remaining 6% had four or five children. The majority of most recent births (62%) were by normal delivery, 9% were assisted (forceps or vacuum extraction), and 28% were by Caesarean Section. Sixty-one percent of respondents indicated that their pregnancy was planned, and 36% reported a previous diagnosis of depression.

Measures

Postnatal depression. The Edinburgh Postnatal Depression Scale (Cox, Holden, & Sagovsky, 1987), a 10-item, well-validated screening tool, was used to assess PND. The scale has sound psychometric properties including high internal consistency in past research (Cronbach's $\alpha = .87$, Cox et al., 1987), and in the current sample ($\alpha = .87$), and good construct validity. A cut-off score of 10 has been shown to have 89% sensitivity for identifying symptoms in the clinical range (Murray & Carothers, 1990). Scores above 12.5 have demonstrated a 93% specificity and 95% sensitivity for predicting symptoms equivalent to MDD using DSM-III criteria (American Psychiatric Association, 1987; Harris, Huckle, Thomas, Johns, & Fung, 1989).

Dysfunctional maternal cognitions. Dysfunctional maternal-specific cognitions were assessed using the Maternal Attitudes Questionnaire (MAQ; Warner et al., 1997). The MAQ consists of 14 items related to motherhood (e.g., to be a good mother I should be able to cope well all the time) and associated role changes (e.g., I have resented not having enough time to myself since having my baby). Items are rated 0-3 such that high scores reflect more negative perceptions of the experience of motherhood. The MAQ has shown good construct validity and reliability in past research (Cronbach's $\alpha = .84$, Warner et al., 1997) and the current sample ($\alpha = .72$).

Dysfunctional general cognitions. The 24-item Dysfunctional Attitude Scale (DAS-24), which assesses fixed negative values and perfectionist attitudes associated with depression (e.g., my happiness depends more on other people than it does on me; I should always have

complete control over my feelings), was used to measure general dysfunctional cognitions. Items are rated on a 7-point scale, higher scores indicating greater endorsement of dysfunctional beliefs. The DAS-24 has exhibited good construct validity, test-retest reliability and internal consistency (Power, Duggan, Lee, & Murray, 1995). Cronbach's α for the current sample was .90).

RESULTS

Cluster Analysis

A hierarchical cluster analysis, using Ward's method on squared Euclidean distances, was performed with total MAQ and DAS-24 scores as the clustering variables for the 89 respondents with scores >10 on the EPDS. Examination of the dendrogram and agglomeration schedule indicated that the optimum number of clusters was three. Three univariate analyses of variance, with cluster membership as the independent variable and the MAQ, DAS-24 and EPDS as dependent variables, were then conducted to explore whether the clusters varied significantly with respect to these variables. Results indicate that all three groups scored between one and two standard deviations above the mean on depressive symptoms: Table 1 (p. 94) displays the descriptive statistics for participants scoring 10 or above on the EPDS, and the number of women in each group.

Two clusters (Cluster 1 and Cluster 2) had EPDS scores that were not significantly different and which suggested that the participants were suffering from depressive illness (i.e., >13; Cox et al., 1987). Participants in Cluster 1 (n=35) had moderately elevated scores on the DAS-24 (>2SDs) and mildly elevated scores on the MAQ (>1-2 SDs); Cluster 2 (n=32) had average range scores on the DAS-24 (i.e., +/- 1 SD) and mildly elevated scores on the MAQ. The mean EPDS score (M = 11.77) for women in Cluster 3 (n=22) suggests that while depressive symptoms were present, these were likely to be sub-syndromal. This cluster's mean scores for the DAS-24 and the MAQ were in the average range.

Tukey's post hoc tests, also reported in Table 1, show that the members of Cluster 1 had significantly higher DAS-24 scores than those of the other two groups (almost 2 SD above the mean for this sample), similar MAQ scores to Cluster 2, but significantly higher MAQ scores than Cluster 3. The DAS-24 scores for Cluster 2 were significantly lower than those of Cluster 1, but significantly higher than those of Cluster 3. The MAQ scores for Cluster 2 were not

Table 1
 Descriptive Statistics for Variables Used in the Study Showing Means for Groups in Homogeneous Subsets
 Based on Hierarchical Cluster Analysis.

Measure	Theoretical		Total sample		Cluster 1		Cluster 2		Cluster 3	
	Min	Max	M	SD	M	M	M	M	M	M
Edinburgh Postnatal Depression Scale	0	30	6.18	4.62	14.23 ^a	13.16 ^{ab}	11.77 ^b			
Maternal Attitude Questionnaire	0	28	3.46	3.08	7.23 ^a	6.91 ^a	3.82 ^b			
Dysfunctional Attitude Scale	24	168	71.21	21.57	113.60 ^a	82.28 ^b	56.91 ^c			

Note: Total sample: $N = 406$; Cluster 1: $n = 35$; Cluster 2: $n = 32$; Cluster 3: $n = 22$. Means that do not share the same subscript are significantly different using Tukey's post hoc tests, $p < .05$.

significantly different to those of Cluster 1, but were significantly higher than those of Cluster 3. Cluster 3 scores on both the DAS-24 and MAQ were significantly lower than those of Clusters 1 and 2.

DISCUSSION

This study examined the cognitions of women experiencing PND. Cluster analysis revealed that within this study's sample, three subgroups could be identified and distinguished on the basis of severity of depressive symptoms (as measured by the EPDS) and/or the nature and strength of maladaptive cognitions. Two groups had EPDS scores suggesting the presence of significant depressive illness. In one group, participants were experiencing high-range general dysfunctional cognitions and moderately high range dysfunctional maternal attitudes. This suggests that for this group depression was the result of a trait-like vulnerability, combined with a maladaptive response to childbirth and new parenting. In the other group, the participants' depressive symptoms were associated with average range general dysfunctional cognitions, but moderately high range dysfunctional maternal-specific cognitions. For this group, it appeared that their depression was substantially a function of maladaptive responses to recent maternal experiences. The third group, whose EPDS scores indicated sub-syndromal symptoms of depression, was found to have average range general dysfunctional and maternal specific cognitions. Thus, there appeared to be no specific type of negative cognitions functioning as a risk factor for depression. Overall, the results of this study support and extend the findings of previous research (Grazioli & Terry, 2000; Warner et al., 1997) by demonstrating that within a sample of women with PND, distinct cognitive correlates of depression can be identified. Such findings have implications for treatment.

Evidence-based clinical guidelines (National Institute for Health and Clinical Excellence, 2006, 2007) suggest a range of psychological interventions for PND which are graded in intensity to parallel the severity of the presenting symptoms. For mild to moderate depression, the recommended management includes self-help strategies such as computerized CBT, non-directive counseling delivered at home, and brief CBT or IPT. For moderate to severe depression, structured psychological treatment (CBT or IPT), supplemented with antidepressant medication if preferred by the patient, is the recommendation. While the literature provides evidence of the effectiveness of each of these treatments (Chabrol et al., 2002; O'Hara

et al., 2000), the persistence of symptoms in some women could be the result of poorly-matched intervention.

Based on the findings of this study, it seems that treatment matching might be improved by assessing both general cognitive style and attitudes towards motherhood. Women who display significantly high levels of general depressive cognitions might benefit most from therapies that focus on the treatment of depression in general (e.g., structured CBT or IPT), whereas women experiencing primarily maladaptive maternal-specific cognitions might be more appropriately treated with IPT, home-based counseling, or a mother-craft program (National Institute for Health and Clinical Excellence, 2007; Perth Clinic, 2006)

Some limitations of this study should be considered. First, while EPDS scores above the chosen cut-off levels suggest the presence of clinically significant PND, without the use of diagnostic criteria (e.g., SCID, First, et al., 2002) it is not possible to firmly assert that these were at the level of an MDD or not. Further, with a response rate of only 37%, it cannot be assumed that the sample was representative of the population of postnatal women. However, comparisons with other community-based samples from Australia (Boyce, Hickey, Gilchrist, & Talley, 2001; Horan-Smith & Gullone, 1998) and the United Kingdom (Cox, Murray, & Chapman, 1993) suggest comparability.

These limitations aside, this study has highlighted the potential value of assessing the cognitions of women presenting with PND, in order to inform a tailored intervention. A useful goal of future research would be to evaluate the effectiveness of cognitive treatments designed to fit subgroups of women who present with predominantly general or maternal-specific maladaptive cognitions.

REFERENCES

- Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*(1), 49-74.
- Alloy, L. B., Abramson, L. Y., Whitehouse, W. G., Hogan, N. A., Tashman, N. A., Steinberg, D. L., Rose, D. T., & Donovan, P. (1999). Depressogenic cognitive styles: Predictive validity, information processing and personality characteristics, and the developmental origins. *Behaviour Research and Therapy, 37*, 503-531.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental*

- disorders* (4th ed.) text revision. Washington, DC: Author.
- Beck, A. T. (1967). *Depression: Clinical, experimental and theoretical aspects*. New York: Harper & Row.
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapies of depression*. New York: Guilford Press.
- Boyce, P., Hickey, A., Gilchrist, J., & Talley, N. J. (2001). The development of a brief personality scale to measure vulnerability to postnatal depression. *Archives of Women's Mental Health, 3*, 147-153.
- Chabrol, H., Teissedre, F., Saint-Jean, M., Teisseyre, N., Roge, B., & Mullet, E. (2002). Prevention and treatment of post-partum depression: a controlled randomized study on women at risk. *Psychological Medicine, 32*, 1039-1047.
- Cooper, P. J., & Murray, L. (1995). Course and recurrence of postnatal depression. Evidence for the specificity of the diagnostic concept. *The British Journal of Psychiatry, 166*, 191-195.
- Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *The British Journal of Psychiatry, 150*, 782-786.
- Cox, J. L., Murray, D., & Chapman, G. (1993). A controlled study of the onset, duration and prevalence of postnatal depression. *The British Journal of Psychiatry, 163*, 27-31.
- Dent, J., & Teasdale, J. D., 1988. Negative cognition and the persistence of depression. *Journal of Abnormal Psychology, 97*, 29-34.
- Elkin, I. (1994). The NIMH treatment of depression collaborative research program: Where we began and where we are. In: Bergin, A. E. and Garfield, S. L. (Eds.), *Handbook of psychotherapy and behaviour change* (4th ed.). New York: Wiley.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B.W. (2002). Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition. (SCID-I/P) Biometrics Research, New York State Psychiatric Institute, NY.
- Grazioli, R., & Terry, D. J. (2000). The role of cognitive vulnerability and stress in the prediction of postpartum depressive symptomology. *British Journal of Clinical Psychology, 39*, 329-347.
- Harris, B., Huckle, P., Thomas, R., Johns, S., & Fung, H. (1989). The use of rating scales to identify post-natal depression. *The British Journal of Psychiatry, 154*, 813-817.
- Hendrick, V. (2003). Treatment of postnatal depression. *British Medical Journal, 327*, 1003-1004.
- Horan-Smith, J., & Gullone, E. (1998). Screening an Australian community sample for risk of postnatal depression. *Australian Psychologist, 33*, 138-142.
- Lovestone, S., & Kumar, R. (1993). Postnatal psychiatric illness: the impact on partners. *The British Journal of Psychiatry, 163*, 210-216.
- Murray, L., & Carothers, A. (1990). The validation of the Edinburgh Post-natal Depression Scale on a community sample. *The British Journal of Psychiatry, 157*, 288-290.
- National Institute for Health and Clinical Excellence (NICE). (2006). *Routine postnatal care of women and their babies*. NICE clinical guideline 37. National Health Service, London.
- National Institute for Health and Clinical Excellence (NICE). (2007). *Antenatal and postnatal mental health. Clinical management and service guideline*. NICE clinical guideline 45. National Health Service, London.

- Norman, W. H., Miller, I. W., & Keitner, G. I. (1987). Relationship between dysfunctional cognitions and depressive subtypes. *Canadian Journal of Psychiatry, 32*, 194-198.
- O'Hara, M. W., Neunaber, D. J., & Zekoski, E. M. (1984). Prospective study of postpartum depression: prevalence, course and predictive factors. *Journal of Abnormal Psychology, 93*, 158-171.
- O'Hara, M. W., Stuart, S., Gorman, L. L., & Wenzel, A. (2000). Efficacy of interpersonal psychotherapy for postpartum depression. *Archives of General Psychiatry, 57*, 1039-1045.
- Olioff, M. (1991). The application of cognitive therapy to postpartum depression. In: T. M. Vallis, J. L. Howes, J. L. & P. C. Miller (Eds.), *The challenge of cognitive therapy: Applications of non-traditional populations*. New York: Plenum Press.
- Perth Clinic (2006). Post natal depression. Retrieved 22nd July 2008 from <http://www.perthclinic.com.au/treatmentprograms/postnatal.asp>
- Power, M. J., Duggan, C. F., Lee, A. S., & Murray, R. M. (1995). Dysfunctional attitudes in depressed and recovered depressed patients and their first degree relatives. *Psychological Medicine, 25*, 87-94.
- Reilly-Harrington, N. A., Alloy, L. B., Fresco, D. M., & Whitehouse, W. G. (1999). Cognitive styles and life events interact to predict bipolar and unipolar symptomatology. *Journal of Abnormal Psychology, 108*, 567-578.
- Stuchbery, M., Matthey, S., & Barnett, B. (1998). Postnatal depression and social supports in Vietnamese, Arabic and Anglo-Celtic mothers. *Social Psychiatry and Psychiatric Epidemiology, 33*, 483-490.
- Warner, R., Appleby, L., Whitton, A., & Faragher, B. (1997). Attitudes towards motherhood in postnatal depression development of the Maternal Attitudes Questionnaire. *Journal of Psychosomatic Research, 43*, 351-358.
- Weissman, A. N., & Beck, A. T. (1978). *Development and validation of the Dysfunctional Attitude Scale: A preliminary investigation*. Paper presented at the meeting of the American Educational Research Association, Toronto.
- Woody, S. R., Taylor, S., McLean, P. D., & Koch, W. J. (1998). Cognitive specificity in panic and depression: Implications for comorbidity. *Cognitive Therapy and Research, 22*, 427-443.
- Zuroff, D. C., Blatt, S. J., Sanislow, C. A., Bondi, C. M., & Pilkonis, P. A. (1999). Vulnerability to depression: Re-examining state dependence and relative stability. *Journal of Abnormal Psychology, 108*, 76-89.